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Federal Communications Commission
Office of Secretary

November 5, 1996

William F. Caton, Acting Secretary
Federal Communications Commission
Room 222 -- Mail Stop 1170
1919 M Street N.W.
Washington DC 20554

Re: Petition for Rule Making filed by The American Radio Relay League, Inc., RM-8737

Dear Mr. Caton:

On behalf of Symbol Technologies, Inc. ("Symbol"), a manufacturer of Part 15 spread spectrum data communications equipment, I am filing the original and one copy of the attached written ex parte communication pursuant to Section 1.1206(a)(1) of the Commission's Rules.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for Symbol Technologies, Inc.

cc: Michele Farquhar, Chief
Thomas Stanley, Chief Engineer
Wireless Telecommunications Bureau

Raymond A. Martino
Director, RF Engineering
Symbol Technologies, Inc.

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November 5, 1996

Michele Farquhar, Chief
Wireless Telecommunications Bureau
Federal Communications Commission
Room 5002
2025 M Street N.W.
Washington DC 20554

Re: Petition for Rule Making filed by The American Radio Relay League, Inc., RM-8737

Dear Ms. Farquhar:

I am writing on behalf of Symbol Technologies, Inc. ("Symbol") to oppose the above-referenced Petition for Rule Making ("ARRL Petition").

The Petition seeks to remove certain technical restrictions on the use of spread spectrum communications by licensees in the Amateur Radio Service. These changes would apply to all of the bands in which spread spectrum is presently authorized including, among others, 902-928 MHz (33 cm), 2390-2450 MHz (13 cm), and 5650-5925 MHz (5 cm).[1/] The Commission has also authorized Part 15 spread spectrum operations in these bands.[2/] As shown below, the public benefits of Part 15 operations are considerable. Many industries have made very substantial investments in Part 15 equipment and rely heavily on Part 15 services. For these reasons Symbol asks the Commission not to make changes in the amateur rules that would threaten the reliable operation of Part 15 devices.

[1/] 47 C.F.R. § 97.305(c).

[2/] More precisely, Part 15 spread spectrum operations are authorized at 902-928, 2400-2483.5, and 5725-5850 MHz. 47 C.F.R. § 15.247.

Part 15 Spread Spectrum Operations

Symbol is the leading manufacturer of portable bar code driven data transaction systems, with two million scanners and hand-held computers installed. Symbol designs, manufactures, and markets bar code laser scanners, portable computers, and radio frequency data communications networks that are used as strategic building blocks in technology systems for retail, warehousing, distribution, manufacturing, package and parcel delivery, and other industries.

Symbol's products include the "Spectrum One" and "Spectrum 24" networks, real time data collection systems that use Part 15 spread spectrum transmission in the 902-928 and 2400-2483.5 MHz bands, respectively. These products, and products that communicate over the network, constitute the fastest growing segment of the retail automation market. Such systems based on high data rates, as opposed to the low data rate obtained on narrow band licensed channels, have revolutionized this industry. Typical applications include--

-- retail: pricing on the sales floor, inventory control on the sales floor and stock room, and incoming receiving control;

-- warehousing and distribution: at the receiving dock, for pick up and put away, and at the shipping dock;

-- manufacturing: raw material, work in progress, finished goods, inventory control, production tracking, and quality assurance reporting;

-- transportation: tracking of shipments so as to reduce lost or misdirected shipments and respond to customer inquiries quickly -- transportation markets serviced include passenger airlines, US Postal, and freight trucking;

-- health care: bedside inventory, patient monitoring, and prescription and dosage control;

-- customer service applications, such as fast and accurate rental car check-in at airports; and

-- wireless store: Point Of Sale (POS) checkout is moving

> toward the use of distributed processing (small hand-held computers used for checkout, shelf replenishment, customer service, etc.) and associated wireless communications over spread spectrum networks, which require a high data rate. Movable POS terminals (such as cash registers) now operate over Symbol's spread spectrum networks allowing flexibility, cost savings, and better customer service.

These systems automate tasks in real time, provide dramatic speed reductions, and increase accuracy. The resulting gains hold down costs (including inventory costs), reduce lost shipments and misplaced items, facilitate "just in time" inventory control for manufacturing and retailing, and permit fast and flexible response to changed conditions. This technology, and others like it, help the United States to maintain a competitive position in global markets.

Based on its extensive experience and its own position in the market, Symbol reliably estimates the present size of the market at approximately $600 million annually.[3/] Symbol alone has installed Part 15 spread spectrum networks for more than 500 customers at more than 10,000 sites in the United States, and expects to ship in excess of $100 million in such networks in 1996. Annual growth rate over the period since product introduction has been in the 30-50% range. The retail industry expects a large percentage of existing stores to "go wireless" during this decade, a step that opens up whole new ways of doing business -- from pen computers carried by sales clerks, to portable hand-held POS registers, to easily movable checkout stations.

Each of these existing (and future) systems is based on spread spectrum technology operating in the Part 15 bands. These innovations increase customer service and operating efficiency in some of the largest industries in the U.S. The hundreds of thousands of application-specific devices that launched this market have since been joined by wireless PBX and wireless Centrex systems and millions of consumer-owned cordless telephones. Other products not yet imagined are certain to appear.

[3/] This estimate is calculated by dividing Symbol's annual revenues for spread spectrum products by its market share, as listed in industry references.

Effect of the Petition

The Commission's Rules already permit amateur spread spectrum operations in the Part 15 bands. But in contrast to Part 15, which is subject to a maximum one watt output power and 6 dBi antenna gain,[4] amateur operations can use up to 100 watts output power with no limitation on antenna gain.[5] In spite of this extreme disparity in authorized power, harmful interference from amateur operations to Part 15 has not been a significant problem to date. But Symbol fears that the changes requested by ARRL, particularly the deletion of Sections 97.311(c) and (d), will lead to recurring harmful interference. Those changes will put amateur signals head-to-head with Part 15 signals, at 100 times the output power permitted to Part 15 and, in the absence of limitations on antenna gain, several hundred times the effective radiated power. Indeed, under the rules requested in the Petition, it would be entirely lawful for an amateur operator to purchase a Part 15 modem, amplify it to 100 watts, and feed it through a high-gain antenna. The resulting signal would threaten to obliterate any Part 15 operation in its path. ARRL's proposal limiting output power to "that which is required for the communication" is small reassurance considering that ARRL also seeks authority for international operations,[6] which could entail communications over thousands of miles. In many cases the proposed rules would permit operations at several tens of watts, if not the full 100 watts.

Symbol objects to these proposals because they threaten the integrity and reliability of important Part 15 services. Shared unlicensed frequency use under Part 15 has been highly successful, particularly with the advent of spread spectrum technology at 902-928 and 2400-2483.5 MHz. Well-engineered Part 15 devices are designed to function properly in an unlicensed environment: While operating within FCC-prescribed limits, they can still accept a reasonable amount of interference without diminishing their capacity to boost users' productivity. Moreover, such devices are able to tolerate incoming interference not only from other Part 15 users, ISM equipment, and Government radiolocation, but also from amateur licensees operating under the current rules.

The ability of diverse users to coexist under the Part 15 regulatory scheme has

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[4] 47 C.F.R. § 15.247(b).

[5] 47 C.F.R. § 97.311(g).

[6] Petition at 7.

not only directly benefited many industries and citizens, but has also advanced the goals of the Commission itself. Equipment is easily available and responsive to customers' needs. The Commission's only regulatory burden is the straightforward process of equipment certification; there is no need to grant and renew licenses, maintain license databases, or resolve quarrels among licensees. Perhaps most important, even a radical technological advance can reach the marketplace quickly, without the lengthy delays required for a Commission rule making. Manufacturers can introduce innovative technologies as fast as they can obtain certifications, and providers can offer new services as fast as the equipment becomes available. In some ways the Part 15 regulatory environment approaches the ideal -- while leaving development and deployment decisions in the hands of the users and the marketplace, it nonetheless effectively protects the public from the effects of harmful interference.

Adoption of the proposed rules would fundamentally alter this state of affairs in the Part 15 spread spectrum bands. The introduction of unanticipated, high-power sources of interference could threaten the continued use of low-power communications devices under Part 15, including Symbol's products. Not only would changing the amateur rules in these bands disrupt present operations, but it would also be a clear disincentive to further development of badly-needed technologies that increase spectrum efficiency through sophisticated sharing techniques.

It does not answer these concerns to say Part 15 users will not be heard to oppose the introduction of a licensed service because they are secondary to licensed services.[7/] Being "secondary" in frequency use does not make Part 15 operations secondary in importance to the public interest. To the contrary, in these days of spectrum overcrowding, the Commission should be actively encouraging shared, unlicensed use. The Commission has always recognized that its rules are part of the overall context in which businesses make decisions about what services to offer and to buy, which technologies to develop and to use, and how to invest available resources. Changes in the rules can bear directly on all of these decisions. Symbol submits that the Commission should strive to achieve regulation characterized by "stability, predictability, and protection of the public interest."[8/]

[7/] 47 C.F.R. § 15.5(b).

[8/] American Tel. & Tel. Co. v. FCC, 836 F.2d 1386, 1394 (D.C. Cir. 1988) (telephone rate regulation).

While the business community understands that regulations will always be subject to change, it is entitled to expect that any such changes will seek the best balance among all legitimate competing interests. To grant the ARRL Petition would miss that balance by a wide margin by seriously underestimating the public interest in ongoing Part 15 operations. It would also warn the public that any technology operating on an unprotected basis cannot be depended upon for long-term service, and that investing in such a technology carries unpredictable and largely unmanageable risks. One rational response on the part of the business community, which needs reliable operation, would be to abandon Part 15 in favor of the interference protection available to licensed services. Such a move, however, would routinely embroil the Commission in the paperwork and dispute resolution that has always characterized licensed operations, and would fly squarely in the face of the Commission's policies favoring deregulation.

The Commission recently faced a similar issue in authorizing the licensed Location and Monitoring Service ("LMS") at 902-928 MHz. In spite of Part 15's unprotected status under the rules, the Commission's weighing of the public interest factors produced a rule under which Part 15 equipment operating within certain narrowly circumscribed limits is deemed not to cause harmful interference to LMS.[9/] The issues here are not precisely parallel, in that the risk of interference from amateur radio to Part 15 is much greater than the other way around, but the LMS proceeding nonetheless constitutes a clear precedent under which the Commission can give Part 15 the protection it needs from amateur spread spectrum.

In short, Part 15 spread spectrum technology has permitted the deployment of new devices and services without the need to allocate additional spectrum. It permits communications devices to increase their interference rejection while simultaneously decreasing their potential to interfere with other systems. The implementation of these new products and services has been driven largely by marketplace forces, unhampered by superfluous regulation. Explicit frequency coordination has been unnecessary, because each transmitter can communicate only with intended receivers. And spectrum efficiency, message privacy, and security have all improved as a result. A grant of the ARRL Petition would jeopardize all of these gains.

9/ Automatic Vehicle Monitoring Systems, 10 FCC Rcd 4695 (1995) (Report and Order), *promulgating* 47 C.F.R. §§ 90.353(d), 90.361.

Conclusion

Symbol has no objection to increased flexibility in amateur spread spectrum operations so long as those operations do not overpower Part 15. In particular, Symbol would not oppose deleting Sections 97.311(c) and (d) if, as to 902-928, 2400-2483.5, and 5725-5850 MHz, amateur spread spectrum operations were subject to a 1 watt limit on output power and a 6 dBi limit on antenna gain, as spelled out in Section 15.247(b).

Kindly date-stamp and return the enclosed extra copy of this letter. If there are any questions about this filing, please call me directly at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for Symbol Technologies, Inc.

cc (by hand):

Office of the Secretary, FCC

Thomas Stanley, Chief Engineer
Wireless Telecommunications Bureau

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